Neighborhoods and Parental Sorting in the United States, 1910-2010

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Introduction

- How do people with children choose where to live?
  - Affects outcomes of children themselves [ChettyHendren2018a]
  - Could affect the provision of public resources [Derenoncourt2020]

- Empirical evidence: house prices and location decisions respond to school quality
  [e.g., Black 1999; Barrow 2002; Bayer, Ferreira, and McMillan 2007; Caetano 2019]

- Available evidence limited by two factors:
  - Evidence only available for small number of places and time periods
  - Existing approaches rely on narrow measures of school quality

- Limited understanding of what parents value, how valuation varies across the US, and how valuation has changed over time
This project

- Estimate migration patterns across the US from 1910–2010
  - Tract-level data from the US Census Bureau, focusing on metropolitan areas

- Find correlates of this net migration
  - Demographics, income, homeownership rates, etc... and how these correlations have changed over time

- Examine how school finance reforms changed parents’ valuation of neighborhoods
  - Did school districts that increased spending see and increase in school-age children?
  - Use reforms from the 1970s to the 2010s [e.g., Card and Payne 2002; Lafortune, Rothstein, and Schanzenbach 2018]

- How do parents respond to neighborhood changes in racial composition?
Strategy

- Don’t have detailed migration patterns of parents, especially going back in time

- Insight: Can compare the number of very young children (ages 0-4) to older children (ages 5-17) in a neighborhoods
  - Neighborhoods with relatively more older children have in-flows of parents with school-age children
  - Neighborhoods with relatively more younger children have out-flows of parents with of parents with school-age children

- Migration rates high for parents with young children (25-37%), lower for parents with older children (8-21%)
Measure of Migration

- Compare ratio of number of children age 5-17 to number of children age 0-4 in a census tract (roughly 4,500 people and 1,000 children) to the ratio in whole metro area

- Want to isolate within metro area location choices:

\[
\delta_{j,m,t} = \ln \left[ \frac{N_{\text{age}5-17}^{j,m,t}}{N_{\text{age}0-4}^{j,m,t}} \right] \frac{N_{\text{age}5-17}^{m,t}}{N_{\text{age}0-4}^{m,t}}
\]

for census tract \(j\) in metro area \(m\) at time \(t\)

- With zero net migration flow of parents \(\delta_{j,m,t} = 0\) assuming trends in log-birth rates are parallel over time across tracts within an MSA
New Haven County, 2010
New Haven County, 2010

Scope: population of New Haven

Counts:

- White\(^1\)
- Hispanic\(^2\)
- Mixed\(^3\)
- Black\(^3\)
- Asian\(^3\)
- Other\(^3\)

Age Distribution:

- 85+:
  - 73.9% White\(^1\)
  - 21.3% Hispanic\(^2\)
  - 1.1% Mixed\(^3\)
  - 3.7% Black\(^3\)
  - 1.1% Asian\(^3\)
  - 0.6% Other\(^3\)
  - 1.1% Total
  - Count: 1,920

- 75-84:
  - 51.3% White\(^1\)
  - 35.1% Hispanic\(^2\)
  - 9.4% Mixed\(^3\)
  - 3.9% Black\(^3\)
  - 2.6% Asian\(^3\)
  - 0.3% Other\(^3\)
  - 2.6% Total
  - Count: 4,018

- 65-74:
  - 41.4% White\(^1\)
  - 39.0% Hispanic\(^2\)
  - 38.4% Mixed\(^3\)
  - 3.9% Black\(^3\)
  - 2.9% Asian\(^3\)
  - 0.9% Other\(^3\)
  - 3.9% Total
  - Count: 7,743

- 55-64:
  - 39.9% White\(^1\)
  - 38.4% Hispanic\(^2\)
  - 38.4% Mixed\(^3\)
  - 3.9% Black\(^3\)
  - 2.6% Asian\(^3\)
  - 0.3% Other\(^3\)
  - 3.9% Total
  - Count: 11,443

- 45-54:
  - 27.2% White\(^1\)
  - 42.3% Hispanic\(^2\)
  - 12.3% Mixed\(^3\)
  - 3.9% Black\(^3\)
  - 2.0% Asian\(^3\)
  - 0.3% Other\(^3\)
  - 2.0% Total
  - Count: 14,443

- 35-44:
  - 27.3% White\(^1\)
  - 30.4% Hispanic\(^2\)
  - 20.2% Mixed\(^3\)
  - 3.9% Black\(^3\)
  - 1.9% Asian\(^3\)
  - 0.3% Other\(^3\)
  - 1.9% Total
  - Count: 15,344

- 30-34:
  - 36.9% White\(^1\)
  - 24.0% Hispanic\(^2\)
  - 18.0% Mixed\(^3\)
  - 3.9% Black\(^3\)
  - 1.9% Asian\(^3\)
  - 0.3% Other\(^3\)
  - 1.9% Total
  - Count: 12,434

- 25-29:
  - 37.9% White\(^1\)
  - 26.5% Hispanic\(^2\)
  - 18.0% Mixed\(^3\)
  - 3.9% Black\(^3\)
  - 1.9% Asian\(^3\)
  - 0.3% Other\(^3\)
  - 1.9% Total
  - Count: 14,244

- 20-24:
  - 33.0% White\(^1\)
  - 29.0% Hispanic\(^2\)
  - 12.3% Mixed\(^3\)
  - 3.9% Black\(^3\)
  - 1.9% Asian\(^3\)
  - 0.3% Other\(^3\)
  - 1.9% Total
  - Count: 14,144

- 18-19:
  - 36.9% White\(^1\)
  - 28.8% Hispanic\(^2\)
  - 12.3% Mixed\(^3\)
  - 3.9% Black\(^3\)
  - 1.9% Asian\(^3\)
  - 0.3% Other\(^3\)
  - 1.9% Total
  - Count: 6,344

- 15-17:
  - 12.8% White\(^1\)
  - 47.1% Hispanic\(^2\)
  - 22.2% Mixed\(^3\)
  - 3.9% Black\(^3\)
  - 2.5% Asian\(^3\)
  - 0.3% Other\(^3\)
  - 2.5% Total
  - Count: 4,313

- 10-14:
  - 13.2% White\(^1\)
  - 43.1% Hispanic\(^2\)
  - 25.0% Mixed\(^3\)
  - 3.9% Black\(^3\)
  - 2.5% Asian\(^3\)
  - 0.3% Other\(^3\)
  - 2.5% Total
  - Count: 8,281

- 5-9:
  - 17.2% White\(^1\)
  - 44.4% Hispanic\(^2\)
  - 20.5% Mixed\(^3\)
  - 3.9% Black\(^3\)
  - 2.5% Asian\(^3\)
  - 0.3% Other\(^3\)
  - 2.5% Total
  - Count: 8,296

- 0-4:
  - 19.6% White\(^1\)
  - 36.8% Hispanic\(^2\)
  - 19.2% Mixed\(^3\)
  - 3.9% Black\(^3\)
  - 2.5% Asian\(^3\)
  - 0.3% Other\(^3\)
  - 2.5% Total
  - Count: 7,792

Note: Counts may not sum to exact population due to rounding.
New Haven County, 1960
Results

- Parental “sorting” has increased substantially since 1940s, but dropped in 1990 and 2000 before increasing again 2010

- Parents tend to move to richer neighborhoods, neighborhoods with higher home ownership rates, tracts with schools with higher test scores. Other measures of school quality (teacher/student ratio, teacher salaries) have little correlation.

- White parents move from central cities at high rates, a pattern that has increased over time

- White parents move to whiter neighborhoods at an increasing rate over time

- School finance reforms had no impact on parental migration patterns

- White parents respond to neighborhood “tipping points” in racial composition, but Black parents do not
Data

- Use Decennial Census data from 1910–2010
  - Focus on metropolitan areas

- Define neighborhoods using census tracts
  - Harmonized to 2010 tract definitions
    - 4,000 inhabitants on average (min = 1,200 and max = 8,000)

- School spending data from 1986 forward from Nation Center of Education Statistics

- School test score and parent/student ratios in 2010 from GreatSchools
Interpreting estimates of neighborhood valuation

- By definition, $E[\delta_j] = 0$ within each metro

- $\delta_j = 0.1$ means that neighborhood $j$...
  - has 10% more 5–17 year-olds than 0–4 year olds, relative to metro averages
  - has amenities that are high enough to attract an extra 10% of 5–17 year-olds

- $SD(\delta_j | j \in m)$ is a measure of the within-metro parental “sorting”
### Table: SD of Neighborhood Valuation, Ten Largest Metropolitan Areas

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<td>0.289</td>
<td>0.213</td>
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Notes: These are the ten largest CBSAs in terms of 2010 population. SDs are weighted by population age 0–17. Average is weighted by population age 0–17.
Cook County, 2010, White
Cook County, 2010, Black

No data
Cook County, 1970, White
Cook County, 1990, White
Average SD, US Metro Areas

Mean SD of neighborhood value

United States Northeast Midwest South West

Mean SD of neighborhood value

0.10 0.15 0.20 0.25 0.30 0.35

United States
Northeast
Midwest
South
West
Average SD, US Metro Areas, White Parents
Average SD, US Metro Areas, Black Parents

![Graph showing the average SD of US Metro Areas, Black Parents from 1940 to 2010 for United States, Northeast, Midwest, South, and West regions.](image-url)
Within MSA Correlations

Median family income  Median house value  Median rent  Share white  Share Black  Share Hispanic

-1  0  1


All  White  Black
Within MSA Correlations
Within MSA Correlations, GreatSchools Data, 2010

- Share free lunch students
- Share other race students
- Share Asian students
- Share Hispanic students
- Share Black students
- Share white students
- Share cert. teachers
- Share exper. teachers
- Share new teachers
- Pupil-counselor ratio
- Pupil-teacher ratio
- Average teacher salary
- Average test score

- All
- White
- Black
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<td>(0.0041)</td>
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<td>Median Family Income</td>
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Standard errors in parentheses
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Table: Regressions on Parental Valuation, Black

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Table: Regressions on Parental Valuation, White

Standard errors in parentheses
School Finance Reforms

- School Finance Reforms starting in the 1970s led to increases in funding in the poorest funded districts (Jackson, Johnson, Persico 2016; Lafortune, Rothstein, Schazenbach 2018)

- Use variation in timing of legislation or court mandated reforms across states.

- Previous research has shown that these reforms led to substantial increases in educational attainment, wages and test scores.
Regressions

- LRS choose one reform per state for states with multiple reforms using methods from Bai (1997). We use the same reform as our "treatment".

- Regression is a difference-in-difference

\[ \delta_{jt} = \theta_j + \kappa_t + \beta * 1(t > t^*) + \epsilon_{jt} \]  

- Run separate regressions for lowest income quintile districts and highest quintile districts (by state)

- Lowest income districts saw increases in spending in post-reform periods, but highest income districts did not (LRS, 2018)

- Dependent variable is neighborhood net migration measure (data from 1990-2010)
### Table: School Finance Reform

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1) Ratio all Low Inc</th>
<th>(2) Ratio all High Inc</th>
<th>(3) Ratio Black Low Inc</th>
<th>(4) Ratio Black High Inc</th>
<th>(5) Ratio White Low Inc</th>
<th>(6) Ratio White High Inc</th>
</tr>
</thead>
<tbody>
<tr>
<td>post_reform</td>
<td>0.0120 (0.0121)</td>
<td>0.0208 (0.0207)</td>
<td>0.0516 (0.0356)</td>
<td>-0.0069 (0.0280)</td>
<td>0.0088 (0.0248)</td>
<td>0.0239 (0.0236)</td>
</tr>
<tr>
<td>Observations</td>
<td>5,379</td>
<td>39,508</td>
<td>927</td>
<td>3,235</td>
<td>2,180</td>
<td>29,227</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.758</td>
<td>0.751</td>
<td>0.783</td>
<td>0.842</td>
<td>0.798</td>
<td>0.713</td>
</tr>
</tbody>
</table>

Standard errors clustered at the state level
What happens in neighborhoods that undergo large change in racial composition?

Use “tipping points” methods from Card, Mas and Rothstein (2008)

Intuition is that once neighborhoods reach a certain non-white percentage the neighborhood “tips” and the white population decreases substantially
Tipping Points, 1970-1980: Change in White Population

![Graph showing nonwhite share relative to metro tipping point, 1990.](image)
### Table: White Parents Highest Migration out of Main Cities, 100 Biggest Metro Areas, 2010

<table>
<thead>
<tr>
<th>Metro Area</th>
<th>Main City Gap, 2010</th>
<th>Main City Gap, 1960</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miami-Fort Lauderdale-Pompano Beach, FL</td>
<td>-0.759</td>
<td>0.099</td>
</tr>
<tr>
<td>New Haven-Milford, CT</td>
<td>-0.740</td>
<td>-0.009</td>
</tr>
<tr>
<td>Boston-Cambridge-Quincy, MA-NH</td>
<td>-0.731</td>
<td>0.029</td>
</tr>
<tr>
<td>Harrisburg-Carlisle, PA</td>
<td>-0.719</td>
<td>-0.026</td>
</tr>
<tr>
<td>Birmingham-Hoover, AL</td>
<td>-0.708</td>
<td>-0.039</td>
</tr>
<tr>
<td>Washington-Arlington-Alexandria, DC-VA-MD-WV</td>
<td>-0.684</td>
<td>0.066</td>
</tr>
<tr>
<td>San Francisco-Oakland-Fremont, CA</td>
<td>-0.671</td>
<td>0.002</td>
</tr>
<tr>
<td>Richmond, VA</td>
<td>-0.668</td>
<td>0.126</td>
</tr>
<tr>
<td>Bridgeport-Stamford-Norwalk, CT</td>
<td>-0.613</td>
<td>-0.104</td>
</tr>
<tr>
<td>Rochester, NY</td>
<td>-0.608</td>
<td>-0.021</td>
</tr>
<tr>
<td>Chicago-Joliet-Naperville, IL-IN-WI</td>
<td>-0.600</td>
<td>0.016</td>
</tr>
<tr>
<td>Metro Area</td>
<td>Main City Gap, 2010</td>
<td>Main City Gap, 1960</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>---------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>McAllen-Edinburg-Mission, TX</td>
<td>0.117</td>
<td></td>
</tr>
<tr>
<td>Las Vegas-Paradise, NV</td>
<td>0.096</td>
<td>0.012</td>
</tr>
<tr>
<td>Cape Coral-Fort Myers, FL</td>
<td>0.083</td>
<td></td>
</tr>
<tr>
<td>El Paso, TX</td>
<td>0.062</td>
<td>0.001</td>
</tr>
<tr>
<td>Riverside-San Bernardino-Ontario, CA</td>
<td>0.021</td>
<td>0.043</td>
</tr>
<tr>
<td>Stockton, CA</td>
<td>0.006</td>
<td>-0.021</td>
</tr>
<tr>
<td>Omaha-Council Bluffs, NE-IA</td>
<td>0.005</td>
<td>-0.008</td>
</tr>
<tr>
<td>Bakersfield-Delano, CA</td>
<td>-0.004</td>
<td>0.022</td>
</tr>
<tr>
<td>Baton Rouge, LA</td>
<td>-0.011</td>
<td>0.037</td>
</tr>
<tr>
<td>Virginia Beach-Norfolk-Newport News, VA-NC</td>
<td>-0.013</td>
<td>-0.024</td>
</tr>
<tr>
<td>Phoenix-Mesa-Glendale, AZ</td>
<td>-0.022</td>
<td>0.046</td>
</tr>
</tbody>
</table>

Table: White Parents Lowest Migration out of Main Cities, 100 Biggest Metro Areas, 2010
Main City Net Migration, White

![Graph showing Main City Gap (White) and Average trends from 1920 to 2020. The graph includes data points and a line representing the average trend.](image-url)
Main City Net Migration, Black
Summary of Findings

- The amount of sorting within MSAs increased from 1940-1980, decreased in 1990 and 2000, then jumped in 2010.

- White parents started moving from main cities in larger numbers in the 1970s, those migrations increased substantially by 2010.

- By 2010, black parents migrated in similar ways to white parents (to richer neighborhoods with higher home ownership), with the exception of migrations from main cities and racial composition of neighborhoods.

- School Finance Reforms appear to have made very little difference in parents’ migration patterns.